

FORESTRY DEPARTMENT
The Pennsylvania State College

521
172
THE HAWAIIAN
FORESTER
AND
AGRICULTURIST

JUNE, 1917

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VOL. XIV. PRICE, TEN CENTS NO. 6

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The Hawaiian Forester and Agriculturist

A Monthly Magazine of Forestry,
Entomology, Animal Industry
and Agriculture.

Issued under the direction of the Board
of Commissioners of Agriculture
and Forestry, Territory of Hawaii.



Address all communications to
DANIEL LOGAN
Editor "THE FORESTER"
P. O. Box 366, Honolulu, T. H.

For business relating to subscriptions
or advertising, address
HAWAIIAN GAZETTE CO., LTD.,
Publishers, Honolulu, T. H.

Price 10c. per copy; \$1.00 a year; Foreign, \$1.25
Entered as second-class matter at the Post Office at Honolulu, Hawaii.

Board of Agriculture and Forestry

DIVISION OF FORESTRY.

FOREST AND ORNAMENTAL TREE SEED AND SEEDLINGS FOR SALE AT THE GOVERNMENT NURSERY.

The Division of Forestry keeps constantly on hand at the Government Nursery, seed and seedlings of the important native and introduced trees. These are sold at prices just covering the cost of collection or growing.

The list includes both forest and ornamental trees, such as Silk Oak, Koa, various species of Eucalyptus, Golden and Pink Showers, Pride of India, Poinciana, Albizzia, etc. The price of the seed varies from 10 to 50 cents per ounce. The seedlings may be had for 2½ cents each, except a few kinds which are 5 cents. Seed of the various palms is also for sale, the price per 100 varying from \$1.00 to \$2.50. All seed is tested before being sent out, which insures its being good.

All communications in regard to seed or trees should be addressed to David Haugs, Forest Nurseryman, Box 207, Honolulu, Hawaii.

C. S. JUDD,
Superintendent of Forestry.

DIVISION OF ENTOMOLOGY.

To give information about insects free of charge is one of the duties of this Division, and Hawaiian readers are hereby invited to make inquiry in person and by mail. In order to be able to advise intelligently or send the right kind of useful insects for relief, we like and sometimes it is indispensable for us to see the insects suspected or caught in the act, also specimens of the injury. In a tin with a hole or two, or a wooden box, specimens may be mailed by parcels post. When specimens are not accompanied by letter, always write your name and address in the upper left-hand corner of the package. Address all communications, SUPERINTENDENT DIVISION OF ENTOMOLOGY, P. O. BOX 207, HONOLULU, HAWAII.

EDW. M. EHRHORN,
Superintendent of Entomology.

PUBLICATIONS FOR DISTRIBUTION.

The Board of Commissioners issues for general distribution to persons in the Territory, annual reports, bulletins, circulars, copies of its rules and regulations, and other occasional papers, which may be had, free, upon application.

A complete list of the publications of the Board available for distribution (together with the titles of certain issues now out of print) is to be found on the cover of the last biennial report.

Applications for publications should be addressed to the Mailing Clerk, P. O. Box 207, Honolulu, Hawaii.

THE HAWAIIAN FORESTER AND AGRICULTURIST

VOL. XIV.

HONOLULU, JUNE, 1917.

No. 6

THE ANTHRAX VISITATION.

The routine report of the superintendents appearing in this issue have been belated on account of press of work due to the details of the anthrax control work. The outbreak on Kauai, as first reported in the April issue of the Forester, is described in detail in the Territorial Veterinarian's report for April appearing in this issue.

On May 24 anthrax was discovered on Oahu in the dairy herd of T. F. Farm on Metcalf street, Honolulu, and has resulted in the loss of 30 animals. On June 8 the disease was reported on Maui and to date there have been deaths from anthrax in six different places. The same precautions that were taken on Kauai, viz., vaccinating exposed animals, burning carcasses and quarantining infected premises have been taken in connection with the Oahu and Maui outbreaks and the situations on all three islands are well in hand with no cause for undue alarm. Only slightly over 300 animals all told have died from anthrax, and although the infection may remain in the soil for years, it is not anticipated that there will be many further losses of animals. A detailed account of the Oahu and Maui outbreaks by the Territorial Veterinarian will appear in the next issue of the Forester.

GOOD STREET PLANTING TREE.

The Division of Forestry has on hand a large supply of the African Tulip Tree, *Spathodea campanulata*, which is very well suited to roadside and avenue planting. A good specimen of the tree may be seen in the yard at the corner of Punahou and King streets, Honolulu. It grows to a stately height and for several months bears clusters of large orange-red blossoms. The Division recommends this tree for roadside planting where there is sufficient room, and to encourage its use for this purpose will furnish large supplies of the tree free of charge for planting along public highways to those who will plant them out and give them the necessary care during the early years of growth. To owners who desire them for planting on their own premises they will be sold at a reduced rate of one cent each.

Applications for this tree should be mailed to David Haughs, P. O. Box 207, Honolulu.

Division of Forestry

Honolulu, Hawaii, May 25, 1917.

Board of Commissioners of Agriculture and Forestry, Honolulu.

Gentlemen:—I respectfully submit the following routine report of the Division of Forestry for the month of April, 1917:

Forest Reserve Planting.

The reforestation of the open government land in upper Manoa Valley within the Honolulu Watershed Forest Reserve was continued during the month by the planting out of about 500 koa trees. Since this is mainly a water conservation project, this native species of tree has been largely used, although a few introduced trees have also been planted on the drier slopes and ridges to determine their adaptability to the region. Since the first of the year the following trees have been planted at this place:

Koa (<i>Acacia koa</i>).....	1259
Japanese cedar (<i>Cryptomeria Japonica</i>).....	850
Benguet pine (<i>Pinus insularis</i>).....	50
Cook pine (<i>Araucaria Cookii</i>).....	50
<hr/>	
Total number of trees planted.....	2209

The planting of koa trees in the Makiki valleys has continued and a considerable number of junipers have also been set out. From the last crop of seed, several thousand young mahogany trees (*Swietonia mahogani*) are being raised for close forest planting in the main Makiki Valley just back of the nursery for the purpose of commercial timber production.

On April 13 there were planted out in the open piece of land just mauka of the Tantalus eucalyptus forest, and near General Davis' house, 37 trees which Mr. J. F. Rock had kindly brought back from the Philippines in September, 1916, for this Division. They consist of the important timber trees of the Philippine Islands, and for the purpose of permanent record their names are given herewith:

Tree No.	Name.	Botanical Name.
1.	Calantas.....	<i>Toona calantas</i>
2.	Betis.....	<i>Bassia betis</i>
3.	Banuyo.....	<i>Wallaceodendron celebicum</i>
4.	Lumbayao.....	<i>Tarristia javanica</i>
5.	Alupag.....	<i>Euphorbia cinerea</i>
6-7.	Camagon.....	<i>Diospyros discolor</i>
8.	Yacal.....	<i>Hopea plagata</i>
9.	Lanete.....	<i>Wrightia laniti</i>
10-11.	Batitinan.....	<i>Lagerstroemia piriformis</i>
12-14.	Bitanhol.....	<i>Calophyllum blancoi</i>
15.	Thingan.....	<i>Hopea odorata</i>
16.	Kamuning.....	<i>Murraya exotica</i>
17.	Lanete.....	<i>Wrightia laniti</i>
18.	<i>Hopea sp.</i>
19-26.	Walingmanoc.....	<i>Palacium sp.</i>
27.	<i>Eugenia sp.</i>
28-31.	Kabal.....	<i>Palacium sp.</i>
32-35.	<i>Palacium sp.</i>
36.	Ipil.....	<i>Intsia bijuga</i>
37.	Kanyinbyu.....	<i>Dipterocarpus alatus</i>

These trees have been permanently staked and tagged so as to retain their identity. Since they are profuse seeders, it is planned to use them in the future as a source of supply of seed so that they may be distributed throughout the Territory.

Mr. J. F. Rock has recently also supplied this Division with a small quantity of seed of the *Albizzia moluccana* from British North Borneo. This is a tree which develops remarkably rapid growth and it is reported that it will grow to the height of 50 feet in two and three-quarter years. This seed has germinated rapidly and the young trees will soon be ready for planting.

Forest Reserve Fencing.

During the month the fence on the makai boundary of the Honolulu Watershed Forest Reserve on the southeast side of Nuuanu Valley was repaired and put in first-class shape. Cattle belonging to various owners had been getting into the reserve from makai, but now this possibility is removed. The total length of fence repaired is .37 mile and the cost of the labor and materials was borne jointly by the government and the adjoining owner, the Dowsett Company.

On April 6, with Ranger Hippie, I visited the Kuliouou Forest Reserve to look into a fencing matter at that end of Oahu. General Lease No. 837 required the lessee to construct a lawful fence on the boundary of the leased land which adjoins the forest reserve. This fence was to have been completed on No-

vember 4, 1914, and to my surprise I found that nothing had been done. The situation was reported to the Commissioner of Public Lands, who has requested the present holder of the lease to comply at once with this requirement.

New Forest Reserve.

The public hearing to consider the setting apart of the Panaewa Forest Reserve, containing 1750 acres, in Waiakea, South Hilo, Hawaii, and the withdrawal of a small piece of land in Makiki and of another in Nuuanu within the Honolulu Watershed Forest Reserve, Oahu, was held on April 10, with a full attendance of all commissioners who were in town and of the Governor and Land Commissioner. There being no objections raised, the Governor on the following day signed the proclamations setting aside this new reserve on Hawaii and withdrawing the two small parcels of land on the existing reserve.

Eucalyptus Cuttings.

On April 11 the Forest Nurseryman and I visited the cuttings in the eucalyptus plantations of the Hawaiian Pineapple Company at Waipio, Oahu, to give advice on the height to which stumps should be cut. We found that blue gum, swamp mahogany and bloodwood trees eight years old were being cut for fuel and posts, and that the posts cut from the bloodwood trees (*Eucalyptus corymbosa*) were particularly good.

Kahoolawe.

A verbal report from Mr. Eben Low made to me on April 20, soon after he had returned from his stay of five weeks on the Island of Kahoolawe, asserts that during this time 103 sheep were captured and removed from the island and that 127 goats were exterminated. Mr. Low estimates that there are still about 30 to 40 sheep and 600 goats on the island. This recalls the fact that the application of Mr. Wm. Gillies to be allowed to go to Kahoolawe for the purpose of cleaning off the goats is still pending before the Board.

This Division has purchased 100 dry coconuts which are now being sprouted at the Makiki Nursery so that they may be taken over to Kahoolawe and planted in some of the sandy coves in order to provide sustenance for whoever may possibly be stranded on the island in the future.

Respectfully submitted,

C. S. JUDD,
Superintendent of Forestry.

REPORT OF FOREST NURSERYMAN.

Honolulu, Hawaii, May 24, 1917.

Superintendent of Forestry, Honolulu, T. H.

Dear Sir:—I herewith submit a report of the principal work done during the month of April:

Nursery.—Distribution of Plants.

	In Boxes Transplanted.	Pot Grown.	Total.
Sold	200	146	346
Gratis	100	3432	3532
Total.....	<hr/> 300	<hr/> 3578	<hr/> 3878

Collections.—Government Realizations.

Collections on account of plants sold.....	\$ 5.05
Rent of Office Building, Nursery grounds, February.....	35.00
Total.....	<hr/> \$40.05

Plantation Companies and Other Corporations.

The distribution of trees under this heading amounted to 20,000 in seed boxes.

Makiki Station.

The work done at this station has been principally routine. Owing to heavy rains, which caused the stream to overflow and cut up the road, we were obliged to blast out a number of rocks in the bed of the stream and build a wall to prevent further damage. The work was done by the men working on the watershed.

Honolulu Watershed Forest Reserve.

During the month of April, 1913 Koa, 156 Juniperus Australes, 461 Sugi, 100 Cupressus Arizonica were planted; total, 1800.

Trees planted during March amounted to 552 koa and 300 algaroba; the latter were planted on the dry slope at lower end of Round Top road, close by the residence section, and the koa on the south slope of Hering Valley, near Makiki Station.

Advice and Assistance.

The writer has made the following number of calls and otherwise given advice and assistance to people in and around the city

who asked for same: Calls made, 12; telephone advice, 14; advice to callers at Nursery, 17; advice by letter, 7.

Very respectfully yours,

DAVID HAUGHS,
Forest Nurseryman.

POINTS ABOUT BANANAS.

They are wholesome.

They are nutritious.

They are cheap.

They are easily digested.

They are always in season.

They are always available.

They are available everywhere.

They are all meat.

They are easy to handle.

They are convenient for the dinner pail.

They are good food when cooked.

They are good food when not cooked.

They are the rich man's luxury.

They are the poor man's food.

They are put up and sealed by nature in a germ-proof package.

They are produced without drawing on the Nation's resources.

For the purpose of maintaining adequate supplies of fire fighting tools where most needed in the national forests of California, the forest service recently placed orders for a supply of portable knockdown tool boxes or kiosks. These boxes, made of heavy galvanized iron, are practically indestructible. Each box is 6 feet long and 2 feet square and will hold 2 dozen or more tools—such as shovels, axes, hoes, saws, rakes—used in forest fire fighting. They will be placed at the crossroads and near towns and other strategic places in the forests where fire fighting equipment may be needed at short notice. Each box is painted a conspicuous color and will be made noticeable by appropriate placards and signs.

Division of Plant Inspection

Honolulu, Hawaii, May 15, 1917.

Board of Commissioners of Agriculture and Forestry, Honolulu,
T. H.

Gentlemen:—I respectfully submit my report of the work done by the Division of Plant Inspection for the month of April, 1917, as follows:

During the month there arrived at the port of Honolulu 40 vessels, of which 25 carried vegetable matter. Of these vessels, five passed through the Panama Canal in transit to the Orient.

Disposal.	Lots.	Parcels.
Passed as free from pests.....	767	15,129
Fumigated	8	19
Burned	84	118
Returned	2	5
 Total Inspected	861	15,271

Of these shipments, 14,888 packages arrived as freight, 197 packages as mail matter and 186 packages as baggage of passengers and immigrants.

Rice and Bean Shipments.

During the month 26,677 bags of rice and 2545 bags of beans arrived from Japan and Oriental ports and after careful inspection were passed as free from pests.

Pests Intercepted.

Approximately 3387 pieces of baggage belonging to passengers and immigrants from foreign countries were examined and 45 packages of fruit and 48 packages of vegetables were seized and destroyed by burning.

On April 5, three orchids were found in the baggage of a passenger from Manila and were fumigated. In the tree limbs to which the orchids were attached we found beetles, and a few ants were found in the packing.

On April 21, two pine trees were found in the baggage of a passenger from Japan and were seized and destroyed on account of being contraband.

On April 24, six eucalyptus trees from California were found in a shipment which were badly infested with a parasitic fungus and were destroyed by burning.

In the mail, one package of juniper seeds from the West Indies and one package of tree seeds from Japan were fumigated as a precaution. One package of corn seed from Japan found in the mail, as well as a package found in the baggage from Korea, were seized and destroyed by burning, such seed being prohibited from entry into the Territory under Notice of Quarantine No. 24 of the Federal Horticultural Board so as to prevent the introduction of certain injurious diseases of corn and closely related plants.

During the month two packages of beneficial insects arrived from Manila for the H. S. P. A. and were delivered to Mr. O. H. Swezey. All soil and packing has been destroyed.

Hilo Inspection.

Brother Matthias Newell reports the arrival of six steamers at the port of Hilo, four of which brought vegetable matter, consisting of 115 lots and 1352 packages; all were found free from pests and were passed for delivery. The steamer Anyo Maru arrived direct from Japan and brought 1190 bags of rice, 239 bags of beans, 34 bags of onions and 5 bags of sesame seed, all of which were found free from pests and allowed to land.

Kahului Inspection.

Mr. Will J. Cooper, inspector at Kahului, reports the arrival of six vessels, two of which brought vegetable matter, consisting of 13 shipments of 362 packages, all of which were passed as free from injurious insects.

Inter-Island Inspection.

Sixty-one steamers plying between the port of Honolulu and other island ports were attended to during the month. The following shipments were passed as free from pests:

Taro	459	packages
Plants	190	"
Vegetables	155	"
Fruit	17	"
 Total passed.....	821	"

The following packages were seized and refused shipment, as they did not meet with the regulations pertaining to soil and infestations:

Plants	5 packages
Fruit	3 "
Total refused	8 "

Respectfully submitted,

E. M. EHRHORN,
Chief of Division of Plant Inspection.

Division of Entomology

Honolulu, Hawaii, May 12, 1917.

Board of Commissioners of Agriculture and Forestry, Honolulu.
 Gentlemen:—During the month of April the insectary handled 37,800 pupae of the melon fly parasite, from which emerged 1098 females and 886 males (*Opius fletcheri*). The distribution of this parasite was as follows:

	Females.	Males.
Honolulu:		
Sheridan Street	460	375
Moanalua	240	185
Fort Ruger	35	35
Castner	130	95
Kauai:		
Hanalei	30	25
Maui:		
Hana	75	45

The following fruit fly and horn fly parasites were also distributed:

Tetrastichus.

Honolulu:		
Pawaa	3000	

Opius humilis.

	Females.	Males.
Honolulu:		
Pawaa	65	10
Makiki	100	50

Diachasma fullawayi.

Honolulu:		
Pawaa	20	20
Makiki	20	20
Maui:		
Hana	25	30

Diachasma tryoni.

Honolulu:		
Pawaa	25	10
Makiki	35	30
Maui:		
Hana	30	20

Spalangia cameroni.

Oahu:
Robinson 60

Corn Leaf-hopper and Parasite.

Honolulu:
Sheridan Street 550
Makiki Nursery 1750
Kaneohe 800

Kauai:
Lihue 1400

Molokai:
Molokai Ranch 600
Pukoo 350

Maui:
Kula 2050
Haiku 700

Respectfully submitted,

DAVID FULLAWAY,
Entomologist.

Division of Animal Industry

Honolulu, Hawaii, July 3, 1917.

Board of Commissioners of Agriculture and Forestry, Honolulu,
T. H.

Gentlemen:—I beg to submit herewith my report on the work
of the Division of Animal Industry for the month of April, 1917:

Anthrax in the Territory of Hawaii.

On April 13 a letter was received from the manager of the Princeville Plantation Company, at Hanalei, Kauai, stating that about fifty head of cattle had died since the beginning of the month, and that the disease had been diagnosed by the Deputy Territorial Veterinarian as hemorrhagic septicemia.

The manager further stated that he had only taken charge of the ranch on April 1, and that he had since learned that at least 18 head of cattle had died previous to that time, and that the carcasses of these animals had been skinned and left to rot in the pasture where they were found.

The writer left Honolulu April 16 and arrived at Princeville Plantation on the forenoon of the 17th. In the meantime the Deputy Territorial Veterinarian had submitted a specimen of the blood from one of the diseased animals to the local Board of Health doctor, who had pronounced the disease anthrax.

Shortly after arrival it was reported that a heifer had just died, and a post-mortem examination was decided upon. The black, tarry blood, the swollen spleen and the extensive gelatinous hemorrhagic exudations under the skin and in the body cavities left no doubt as to the diagnosis, and subsequent microscopic examination confirmed that the disease was anthrax.

Nature and Cause of Anthrax.

There is probably no infectious disease so well known and so widely spread over the world as anthrax. Historians claim that anthrax constituted one of the seven plagues of Egypt; and many of the worst plagues, which devastated Europe and other countries during the middle ages and up to this century, can, from the description, have been no other disease than anthrax. As early as 1836 the transmissibility of the disease was proven by inoculation as well as by feeding of anthrax blood. In 1863 Davaine proved the presence in the blood of the minute, rod-shaped bodies which are known as the anthrax bacilli.

Geographical Distribution.

Anthrax is known over practically the whole world, its prevalence being influenced only partly by heat and cold, but principally by the amount of moisture required for the development and propagation of the bacillus. In the United States anthrax districts have been known along the lowlands and river bottoms in all of the Gulf States; Missouri, for instance, having suffered from periodical outbreaks ever since 1836. Anthrax is a disease of the spring and summer months, though cases may occur at all times of the year.

The cause of the disease is, as stated, the anthrax bacillus, a comparatively large rod-shaped micro-organism, which, in dried specimens, appears to have absolutely square ends. This feature is believed to be characteristic of the anthrax bacillus alone, all other rod-shaped micro-organisms having more or less rounded ends.

The bacillus multiplies by fission, whereby chains, resembling a stick of bamboo, are formed. It grows readily in milk, bouillon and other culture media, while blood offers the most favorable opportunity for its rapid development. When placed under unfavorable conditions the bacillus forms spores or seeds, which are very resistant to all destructive agents and may remain quiescent for long periods of time, but which, when again favored by heat and moisture, will develop into virulent bacilli, which, as soon as they gain entrance into the body of susceptible animals, may cause anthrax to break out.

Animals Affected.

Practically all domestic animals as well as human beings may contract the disease, though with a varying degree of susceptibility, both as regards species and individuals. The plant-eating animals, for instance, are very susceptible, while meat-eating ones are less so. Cattle and sheep, being ruminants, are extremely susceptible, and as a rule contract the fulminating or apoplectiform type of the disease, while horses and mules frequently live several days, exhibiting the local and skin form, and some cases recover. Cattle and sheep, which seemed well when last seen or fed at night, are usually found dead in the morning, while horses and mules may show extensive swellings around the throat and neck and may live for several days before succumbing to the disease. Swine are much less susceptible, but may develop the disease after feeding on anthrax-infected carcasses. Dogs and cats are quite immune to the disease, but may contract it after partaking of large portions of anthrax-infected carcasses. All of these latter animals develop the form known as gloss anthrax, which is characterized by swellings and discoloration along the throat and neck, difficulty in swallowing, vomiting, profuse bloody diarrhoea, high fever and death.

Manner of Infection.

There are three ways by which animals may become infected, namely, by ingestion, by inoculation, and by inhalation. The most important of these is ingestion, which occurs when animals are turned out on anthrax-infected pastures. Next in importance is inoculation, which is brought about by contact of abrasion and wounds with affected material, or when the same is carried by flies or other insects from an anthrax carcass to a healthy animal. Infection by inhalation occurs when dust contaminated with anthrax spores gains entrance to the respiratory tract or the lungs of susceptible animals.

Infection of the Soil.

Soil becomes infected with anthrax by discharges from animals suffering from the disease or by the dead bodies of animals, which are allowed to decompose on the surface. It is therefore very important to limit the wanderings of affected animals to the smallest possible areas and to dispose of all anthrax carcasses in such a way as to insure the most complete destruction of the infection.

Disposal of Carcasses.

The disposal of an anthrax carcass should never be left to the owner, nor should anyone be allowed to open the carcass of an animal that is supposed to have died from anthrax. For diagnostic purposes a drop of blood may be drawn from the jugular vein by means of a hypodermic syringe, and the carcass should then be saturated with crude oil, elevated from the ground by rolling it onto a couple of fence-posts, at least six inches in diameter, and a fire built over it, which will insure its complete incineration. This will require at least half a cord of wood and from fifteen to twenty gallons of crude oil. Where no wood can be secured the carcass may be buried, but the grave should be at least six feet deep, and care should be taken that the infected surface where the carcass was lying, be shoveled into the grave first, and that the grave be well banked up to prevent it from sinking in after the decomposition of the carcass, and the forming of a pool over it. It is also advisable that such graves be surrounded by a fence.

Symptoms of Anthrax.

As early as 1893 the writer, who was then a veterinary inspector in the service of the Federal Bureau of Animal Industry, investigated an extensive outbreak of anthrax in the southern part of Illinois. His report on this outbreak was published in the annual report of the said bureau, and as it embraces many points of interest as regards the manner in which the disease generally

manifests itself in a typical anthrax district, as well as describing the symptoms of anthrax in the various classes of domestic animals, the following paragraphs are quoted herewith:

"The symptoms of anthrax will vary with the species and with the type of the disease, except that in the last stages of any of the three types the most pronounced symptoms are identical. In the most acute type the animal may appear at first to be perfectly well and keep along with its fellows even when its temperature is very high—as high as 106° F. Along with such a temperature we shall of course find a rapid pulse and increased respiration. When one is standing close beside such an animal the heart beats may be plainly heard. Soon other symptoms, such as grinding of the teeth, tremors, and standing with head down, appear. Then appear drooping of the head and ears and a disposition to lie down. Animals that have been lively will now decline to rise unless handled roughly. They become stupid and sleepy and very weak in the hind parts. Whereas the temperature has all along been high, it now shows a sharp decline, and before death may become subnormal. The visible mucous membranes are a dusky red, especially those of the rectum and vulva. There is a bloody nasal discharge. The feces will be coated with a bloody mucus. Local swellings appear in the mouth, throat, neck, and breast (especially in horses), and there are sharp attacks of colic and convulsions which end the misery of the animal in from twelve to forty-eight hours after the disease is first noticed. Pregnant animals are liable to abort and thus greatly spread the infection through the copious discharges. An outbreak has its highest mortality at its onset, while later on some animals, especially horses and mules, may recover. In the most acute types, which occur mostly in cattle and sheep, the animal is found dead. A cow which seemed well at night is found dead in the morning, or if death occurs in the daytime, the illness is of short duration, occupying only a few minutes or one to two hours. In these sudden attacks the symptoms follow each other so rapidly and death is so sudden that sometimes the owner is convinced that the animal has been poisoned. The attack is ushered in with trembling, anxious expression, high fever, rolling of the eyes, and convulsive movements, soon followed by general convulsions and death.

"In the local form or cutaneous anthrax in cattle, swellings appear suddenly on different parts of the body at one or many places, and the animal dies with the same symptoms as occur in the most acute type when the bacilli reach the circulating blood from these local lesions. When the infection occurs in the tongue or pharynx, we have in the first case gloss anthrax, and in the latter pharyngeal anthrax, the symptoms varying somewhat, according to the part most affected; but the general constitutional symptoms will be those already described. In some cases the most prominent symptoms at first will be enormous swellings of the rectal mucous membrane.

"In the local form, or cutaneous anthrax, in the horse, the swellings occur at the points of entrance of the bacilli or spores, where there are abrasions of the skin or mucous membrane, or where biting insects have brought the infection from a previous case. These swellings appear suddenly at the point of inoculation and are characterized by a rapidly-spreading edema. The general symptoms are not so urgent, the fever is less intense, and the mortality, while not so great as in the more acute form, is still high.

"Post-Mortem Appearances.

"The animal that has died of anthrax will nearly always be found much bloated, with blood coming from the nose and rectum. There will be evidences on the ground that the animal died a violent death, in convulsions. Local swellings will be present or absent according to the type of the disease. In the rapidly fatal cases little change will be noted either in the blood or internal organs beyond those produced by high blood pressure, indicated by swollen spleen and engorged liver. The carcass itself—the edible portions—would show nothing that would make it doubtful as food. In the more prolonged cases a hemorrhagic condition will be noted in all the internal organs. The blood will be tarry in appearance and will not clot. The heart is often light in color, while on the inside it will be found deeply stained and containing dark, uncoagulated blood. The liver may be found enlarged and is easily torn in handling, presenting on its surface hemorrhagic areas. The spleen is often specially enlarged and distorted in shape, and ruptures on handling.

"The bacilli of anthrax can be found in largest numbers in those organs where the lesions are most pronounced, namely, the spleen, liver, and engorged lymphatic glands, but they are commonly found in any part of the vascular system. In the serous cavities, such as the pericardial, the pleural, and the peritoneal, may be found a sanguineous fluid consisting of serum, red and white cells, and anthrax bacilli. The hyperemia and areas of the extravasated blood may appear at any point of the body where the bacilli have become localized and enormously multiplied, forming capillary embolisms, which consist of broken-down blood corpuscles, and bacilli. Hence they are frequent in the tongue, throat, lungs, stomach, and intestinal walls; the mesentery and the omentum; the skin, connective tissue, and the muscles.

The Cause of Death.

"From the manner of death it would seem that the poison of anthrax acts specifically upon the center of respiration, this in turn allowing a fatal accumulation of carbon dioxid in the blood. That it is the replacement of the oxygen of the blood by carbon dioxid that is the immediate cause of death in anthrax is further shown by the loss in the blood of the property of coagulation, it

being known that carbon dioxid precipitates and throws out of action the fibrin-forming element of the blood—fibrinogen."

Anthrax on the Island of Kauai.

From the above description of the symptoms, nature and cause of anthrax it will be seen that the disease is one that cannot readily be carried by live animals for any considerable distance, for the simple reason that when the infection has once gained entrance into the blood the victim dies in the course of a few hours to two to three days. It would therefore be next to impossible for the disease to reach the Territory by means of live animals, even though carried on the fastest passenger steamers. The question of how the disease reached the Territory and became epidemic in practically the most remote district on the Island of Kauai is therefore one that is giving the sanitary authorities considerable food for thought. Various theories have been advanced, the principal of which was the possible introduction by means of grass seed imported during recent years from Australia. The plausibility of this theory is refuted by the appearance of the disease in pastures, districts and even other islands, where no imported grass seed was ever planted. Another theory, that the infection might have been introduced by the means of imported bone meal, even though such material may actually have been fed in the salt licks on Hanalei ranch, has failed of proof, although numerous guinea pigs, inoculated with a filtrate prepared from the said licks, offered every opportunity for the demonstration of the possible presence of the infection.

These inoculation experiments were undertaken by the bacteriologist of the local U. S. Marine Hospital Service, Dr. D. H. Currie, and could hardly have failed in the purpose, had the disease been introduced with said bone meal. Besides, a number of outbreaks have since occurred in districts on the islands where no bone meal was ever used, and the question consequently remains an open one to the present day.

Progress of Disease on Kauai and Measures of Control.

As already stated, more than sixty animals were known to have died by the time the diagnosis of anthrax was finally established, that is on April 17. A week before, the manager had called in the Deputy Territorial Veterinarian, Dr. Glaisyer, who had diagnosed the disease as hemorrhagic septicemia, a mistake quite excusable on account of the great similarity of the two diseases, and especially because anthrax was known never to have occurred in the Territory; nor was its introduction considered likely or even possible. That the microscope should have been used sooner is a charge easily made when based on subsequent developments, but the writer doubts whether he would have made a microscopic examination of the blood much earlier himself, as

all the veterinary periodicals from the mainland were overflowing with accounts of the unprecedented losses of cattle from hemorrhagic septicemia while none recorded the appearance of anthrax. The only justifiable charge of negligence would seem to rest with the manager in failing to report such an unusual mortality without delay; and the subsequent losses undoubtedly could have been greatly reduced had measures of control and suppression been instituted a week or even a few days earlier. Not until April 15 did any word reach this office, even though fifty head of cows had died at the time and were still dying faster than they could be buried. As no steamer was due to leave for Kauai before Monday the 16th, the following wireless message was sent to the manager, the impression then being that the disease was hemorrhagic septicemia:

“Parish, Princeville Plantation, Kauai.

“Message today. Two hundred vaccine leave Monday. Nørgaard cannot go. Isolate affected, burn dead, vaccinate all exposed. Write or wire further losses.

“RICE, President Board of Agriculture.”

In order to elucidate subsequent developments it is of importance to note the explicit instructions with regard to the disposal of the carcasses by burning.

Meanwhile the writer was busy testing several hundred head of cattle at Kawailoa, Kahuku and Malaeakahana, the Assistant Territorial Veterinarian, Dr. Case, being at the time stationed at Hilo.

On Monday, the 13th, the following message and letter were received from Dr. Glaisyer:

“A. H. Rice,

“Board of Forestry and Agriculture, Honolulu.

“Send 750 doses vaccine. Fifty-five deaths. Vaccine urgently needed. 200 not adequate. Impossible to burn bodies, dying too quickly. Am burying and liming. Six deaths today.

“GLAISYER.”

“Hanalei, Kauai, T. H., April 13, 1917.

“Mr. A. H. Rice,

“Chairman, Board of Forestry and Agriculture,
Honolulu, H. I.

“Dear Sir:—I have the honor to submit a brief report of the outbreak of hemorrhagic septicemia on Princeville Plantation to date.

“I arrived last Monday morning, April 9, and found from Mr. Parish, acting manager, that previous to his taking charge of the

ranch, March 22, some seventeen head had died. During the remainder of the month more died, but it was considered that these animals died from the heavy rainfall and not much attention paid to it. They were then moved to a lower paddock, better protected from winds, etc., but the losses did not cease and I was called. Up to this time about 40 or 41 head had died. Monday and Tuesday there was a let-up in the number of deaths but today, April 13, the number has risen to eight, making a total of fifty-eight head. Immediately upon my arrival I posted some recent deaths, and diagnosed hemorrhagic septicemia. After consulting with Mr. Isenberg and Mr. Parish it was considered best to call Dr. Nörgaard. The diseased carcasses had been left lying where they fell, and I immediately had a gang of men put to work burying these carcasses and burning them thoroughly. It is practically impossible to get enough wood to burn them all, quick enough, as there are so many. After burying, the animals are covered with quicklime, then earth, and the ground adjacent thoroughly covered with lime also.

"It is unfortunate that these animals were all skinned, and the hides salted, the carcasses being left to harbor and spread infection. It was then noticed that the pack horses used in carrying these hides caught the disease, and six of them have also died. Two more horses who were with these pack horses steadily have also died, and we think that it was owing to these horses being turned in a paddock with cattle that the secondary infection took place. Also carrying these dripping hides around has contaminated other paddocks.

"The course of the disease has been very short, the animals being found dead in the morning after being well the night before, and dying or being found dead in the afternoon at 4:30 o'clock, when there was not a sick one to be seen on our rounds at 9:30 a. m.

"Until today I have been unable to see a sick animal. In horses the course is longer, generally from two to four days. Two I believe are going to recover. The animals that have died so far (58) with the exception of two have been fat cows and heifers.

"I have quarantined Hanalei district from Waiahole bridge to the foot of the hill at Kalihiwai, and have guards day and night. Two hundred doses of vaccine will not be enough and we should have not less than seven hundred and fifty doses if not more, in case it should break out in other paddocks. I will stay here until the outbreak is pau, but would be very glad to have Dr. Nörgaard come and look things over and give advice. I will make a more detailed report later and will advise number of deaths each mail day.

"Very respectfully,

"A. R. GLAISYER, Dr. M."

On Monday, April 16, the following message was received from Dr. Glaisyer:

"Microscopic examination blood animals dying Hanalei reveals anthrax. Two deaths today. Request Nörgaard come at once. Bring anthrax vaccine instead of vaccine previously ordered.

"GLAISYER."

From the message it appeared that the diagnosis has been made by Dr. Kuhns, who represents the Board of Health in the Kealia district of Kauai.

A cable message ordering 1000 doses of anthrax serum-vaccine was forwarded to San Francisco without delay.

At noon the Legislature representatives for the Island of Kauai had all been apprised of the serious nature of the outbreak and measures were taken at once to secure an appropriation with which to fight the disease. At 5 o'clock the same evening the writer left for Lihue and was, as already stated, enabled to confirm Dr. Kuhns' diagnosis the following day.

While there was a possibility that some of the cattle that had already died might have been suffering from hemorrhagic septicemia, it was decided not to continue with the injection of this vaccine, as it was feared that the rounding up of the cattle might spread the disease further, and after having issued all necessary instructions in regard to the disposal of the dead animals as well as approving of the quarantine already established by Dr. Glaisyer, the writer returned to Honolulu in order to finish up the most pressing business waiting him there. Two days later, however, the writer again left for Kauai to take personal charge of the fight of the disease, it having then been learned that the Legislature would provide the necessary funds for this purpose. The loss from anthrax at that time summed up about as follows:

Previously reported, 55 head, mostly cows dead and buried.

April 13, 8 cows, 1 stallion, 1 horse.

April 14, 3 cows, 1 bull, 2 steers, 2 mules.

April 15, 2 cows.

April 16, 2 cows.

April 17, 4 cows.

April 18, 2 cows.

April 19, 2 cows, 1 mule.

April 20, 3 cows.

April 21, 1 cow, 1 mare.

And until the arrival of the vaccine on April 25 a varying number died each day.

In order to dispose of these carcasses it became necessary to employ a large number of laborers and to hire an auto-truck in order to distribute loads of wood throughout the various pastures where the carcasses were scattered. Two men were then detailed to each carcass with a team of horses with a scraper, to re-

move all the infected sod to a depth of from 4 to 6 inches, which was heaped on top of the places where the carcasses had been burned, and the mound thoroughly sprinkled with a 1 to 100 solution of corrosive sublimate. The graves of the animals which had been buried were located as far away as possible and the same procedure applied to the surface over the graves. A larger amount of sod and dirt would be heaped on top of the graves, in order to prevent the same from sinking after the decomposition of the animal and the forming of a depression, and eventually a pool over the grave.

The serum vaccine was received on April 25, all available chutes having in the meantime been reconstructed for vaccination purposes. From that time on all the animals in the infected pasture were passed through the chute and injected with 10 c. c. anthrax serum on one side of the neck and 1 c. c. anthrax vaccine on the other side, the two injections being made simultaneously by one operator on each side of the chute. Unfortunately strong, cool rains prevailed nearly every night which may have been the cause of the death of a number of the animals following the vaccination. In any case the vaccine failed to stop the loss to the extent which had been hoped for. There can be little doubt that had the vaccine not been applied the rate of mortality would have continued to increase instead of being greatly reduced.

By the end of the month all of the vaccine had been used up and new cases of anthrax had begun to appear in heretofore uninfected districts. On April 30 the total losses were estimated at about 90 head. At this time a second shipment of 1000 doses of serum vaccine was received and it was decided to continue with the vaccination until all animals on the ranch had been treated.

The further history of the outbreak will be dealt with in the May report of this Division.

The following rule and regulation had in the meantime been promulgated by the Board and published in the daily papers of Honolulu and Kauai:

RULE X

DIVISION OF ANIMAL INDUSTRY.

"Rule and Regulation of the Board of Commissioners of Agriculture and Forestry concerning the quarantine of all domestic animals on the Island of Kauai, on account of Anthrax and Hemorrhagic Septicemia.

"Owing to the fact that disease known as Anthrax or charbon, and Hemorrhagic Septicemia, which affect most classes of domestic animals, and the former of which may be transmitted to man, have made their appearance on the Island of Kauai, it is hereby ordered:

"Section 1. That there is hereby declared a quarantine of the

Island of Kauai, and no domestic or other animal of any class or kind shall be shipped from nor be allowed to leave the Island of Kauai until this quarantine has been lifted by the Board of Agriculture and Forestry.

"Section 2. That the Territorial Veterinarian shall proclaim special quarantine on such sections of the Island of Kauai where these diseases are prevalent. Such special quarantine to be enforced in accordance with the direction of the Territorial Veterinarian.

"Section 3. That it shall be the duty of any person, or persons, whether owner of live stock or not, to report without delay the appearance of any kind of disease among live stock to the Territorial Veterinarian, his assistant or deputy, as well as to assist him in every way to locate, control and suppress any and all cases of the disease in question.

"Section 4. Any person violating the above rule shall be guilty of a misdemeanor and upon conviction thereof shall be punished by a fine not to exceed five hundred dollars (\$500.00), as provided by Section 529, Revised Laws of Hawaii for 1915.

"This rule shall take effect upon its approval by the Governor of Hawaii.

"Approved this 20th day of April, 1917.

"(Signed) LUCIUS E. PINKHAM,
"Governor of Hawaii."

Tuberculosis Control.

The following dairy cattle were tested during the month:

	Total	Passed	Condemned
O. R. R. & L. Co., Kawaihoa.....	177	177	0
" Kahuku Ranch .	364	359	5
" Malaekahana			
Ranch	263	263	0
" Kahuku Ranch .	214	212	2

From the above list it will be seen that a total of 1018 head were tested, out of which number 1011 were passed and tagged, and 7 condemned and branded. The condemned animals were taken to Honouliuli abattoir to be slaughtered.

Sorehead.

During the past month 200 c.c. of chicken pox vaccine was produced in the laboratory, and the following persons were given some: Mr. H. W. Baldwin of Hamakuapoko, Maui, 100 c.c., and Mr. B. P. Zablan of Waianae, Oahu, 100 c. c.

Importations of Live Stock.

S. S. Lurline, San Francisco—6 mules, City Mill Co.; 16 mules, Schuman Carriage Co.; 12 colts, Aubrey Robinson, Makaweli, Kauai; 2 horses, Schuman Carriage Co.; 10 bulls (Hereford), A. & B., Kahului, Maui; 1 horse, A. & B., Kahului, Maui; 1 horse, Mr. Couelho, Kahului, Maui; 5 cts. poultry, J. C. Rent, Kahului, Maui; 5 cts. poultry, Wo Chong.

S. S. Maui, San Francisco—1 dog, "Boston Bull Bitch," Dr. W. T. Monsarrat; 1 dog (bull), Lieut. McNickell; 2 parrots, Mrs. J. H. Raymond; 2 canaries, Mrs. J. H. Raymond.

S. S. Manoa, San Francisco—1 dog, P. R. Isenberg; 1 ct. poultry, Cal. Feed Co.; 1 ct. poultry, F. E. Richardson; 11 cts. poultry, Wo Chong Co.; 5 cts. poultry, J. C. Rent.

S. S. Niagara, Vancouver—1 dog (fox terrier), J. C. Miller.

S. S. Shinyo Maru, Orient—1 dog (Eng. bull), Z. Brudkowski; 6 cts. pheasants, E. H. Paris.

Respectfully submitted,

VICTOR A. NORGAARD,
Territorial Veterinarian.

The First A. R. O. Record Made In Hawaii.

By RALPH J. BORDEN, *Agriculturist at Kamehameha Schools.*

To the Kamehameha Schools goes the honor of having bred and raised the first dairy cow to qualify for Advanced Registry (the honor class for dairy cows), in the Hawaiian Islands.

The cow which has gained this honor, Jannek Ormsby, is a registered Holstein-Friesian animal, not yet two and a half years old. She is well built, of good size for her age, has a large framework, a strong constitution and a remarkably good digestive system. She was put on official test, under supervision of an official of the College of Hawaii, seven days, after dropping a fine heifer calf, and for seven days was milked at eight-hour intervals, producing 281.2 lbs. of milk containing 8.7 lbs. of butterfat. This is equivalent to 10.9 lbs. of butter. Considering the poor pasturage and the exceptionally lifeless weather at the time the test was made, the production is very satisfactory and this young cow gives promise of developing into an excellent milk-producing animal.

Jannek Ormsby is sired by Prince Ormsby of Sleepy Hollow, a bull secured from California in 1913 and which has since been sold to the Parker Ranch on Hawaii. Her dam, Jannek Pietje Korndyke, is also an imported animal from Iowa, and besides this daughter has produced another daughter and two sons during the four years she has been in Hawaii. She has made 323 lbs. of milk in seven days from three quarters, one quarter having been spoiled by garget several years ago.

During the seven days that Jannek Ormsby was on strictly official test, she consumed the following amount of feed: 7 lbs. bran, 27 lbs. rolled barley, 27 lbs. rolled oats, 38 lbs. Suremilk, 9 lbs. oil cake meal, 36 lbs. beet pulp, 105 lbs. alfalfa hay, and about 100 lbs. of freshly cut green alfalfa. At the then prevailing prices, this feed cost \$6.44. The time consumed in grooming, feeding, milking, cooling and bottling the milk and cleaning her stable amounted to about one and one-half hours per day. At twenty-five cents an hour, it cost \$2.63 to take care of her, during the test. This made her total cost of feed and labor for seven days, \$9.07. She produced 281.2 lbs. or about 131½ quarts of milk. This retailed for twelve cents a quart or for \$15.78. This account shows a credit difference of \$6.71 between receipts for milk produced and cost of feed and labor. Crediting the animal with the value of her manure and the increase in her own valuation and charging her for a few minor costs like the use of building, wagon, bottles, pails, interest, etc., there is still a neat little sum to show for the week's work.

At the same time that Jannek Ormsby was tested, another purebred registered Holstein-Friesian cow, Duchess Mollie Tritomia, at three and one-half years of age, also qualified for A. R. O., making in seven consecutive days 322.6 lbs. milk containing 10.25 lbs. of butterfat (equivalent to 12.5 lbs. butter). This record was made 33 days after calving, and considering the fact that during the last two days of her test, she refused to eat any grain, the quantities obtained are very good.

This animal was imported from California in 1915. She is of excellent breeding, her pedigree containing a long list of A. R. O. cows. Her dam, also owned by the Kamehameha Schools, has an A. R. O. record of 352 lbs. milk and 14 lbs. butterfat in seven days at three years of age.

Duchess Mollie Tritomia was fed similarly to Jannek Ormsby, receiving but a slightly larger ration, as befitted her larger production. She also has something to her credit when her expenses are deducted from her returns.

Both of these animals which have made the first A. R. O. records in Hawaii will bear watching. They are still young and in excellent health and should they continue as they have begun, they should do much to convince our dairymen of the value of purebred cattle and to increase the popularity of the Holstein-Friesian breed in Hawaii.

BY AUTHORITY.

TERRITORY OF HAWAII

BOARD OF COMMISSIONERS OF AGRICULTURE AND FORESTRY

RULE XII

DIVISION OF ANIMAL INDUSTRY

Rule and regulation of the Board of Commissioners of Agriculture and Forestry concerning the quarantine of all domestic animals on the Island of Maui, on account of Anthrax and Hemorrhagic Septicemia.

Owing to the fact that diseases known as Anthrax or Charbon, and Hemorrhagic Septicemia, which affect most classes of domestic animals, and the former of which may be transmitted to man, have made their appearance on the Island of Maui, it is hereby ordered:

Section 1. That there is hereby declared a quarantine of the Island of Maui, and no domestic or other animal of any class or kind or their products shall be shipped from or be allowed to leave the Island of Maui until this quarantine has been lifted by the Board of Agriculture and Forestry, or on written permit from said Board.

Section 2. That the Territorial Veterinarian or his deputy shall proclaim special quarantine on such sections of the Island of Maui where these diseases may prevail. Such special quarantine to be enforced in accordance with the direction of the Territorial Veterinarian or his deputy.

Section 3. That it shall be the duty of any person, or persons, whether owner of live stock or not, to report without delay the appearance of any kind of disease among live stock to the Territorial Veterinarian, his assistant or deputy, as well as to assist him in every way to locate, control and suppress any and all cases of the diseases in question.

Section 4. Any person violating the above Rule shall be guilty of a misdemeanor and upon conviction thereof shall be punished by a fine not to exceed five hundred dollars (\$500.00), as provided by Section 529, Revised Laws of Hawaii of 1915.

This Rule shall take effect upon its approval by the Governor of Hawaii.

Approved this 13th day of June, 1917.

LUCIUS E. PINKHAM,
Governor of Hawaii.

Honolulu, Territory of Hawaii.

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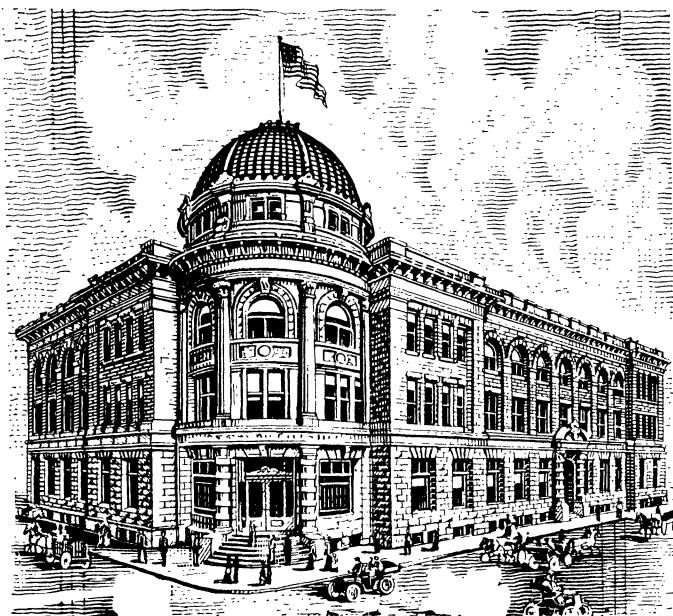
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